

## REMARKS

Claims 1-70 are pending in the application. After entry of the amendment, claims 71-138 will be pending. Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons which follow.

All the amendments to the claims are supported by the specification as filed. In claim 71 *et al.*, the substitution of "1 to 8 atoms" with "1 to 8 carbon atoms or 1 to 7 carbon atoms and 1 heteroatom or 1 to 6 carbon atoms and 2 heteroatoms," is supported at least at page 8, lines 34-39, page 9, lines 21-23, and the formulas and figures throughout the specification. The artisan of ordinary skill would know from inspection of the specification that heteroatoms exclude hydrogen atoms.

In claim 71 *et al.*, the phrase "Ar represents an aromatic ring chosen between a derivative of toluene or a condensed polycyclic aromatic hydrocarbon," is supported at page 7, lines 36-37, for example. As noted below, the Examiner recommends replacing "derivative" with "compound," which applicants believe to be synonymous.

Claim 74 is supported, for example, at page 8, lines 2-19, especially at lines 16-19. Claim 77 is supported at page 8, lines 30-33. The nonfunctionalized linear aliphatic chain comprising 5 atoms recited in claim 102 is supported, for example, at page 9, lines 21-25.

### ***Title of the Invention***

The title of the invention has been amended to be more descriptive of the claimed invention.

### ***The Specification***

The specification has been checked for errors, and a number of obvious typographical errors have been corrected. These corrections do not enter new matter into the application.

### ***Abstract of the Invention***

An Abstract has been added on a separate page, in compliance with 37 C.F.R. § 1.72(b).

***Rejection under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph, and 35 U.S.C. § 101***

Claims 1-27 are rejected as improper under 35 U.S.C. §§ 112, second paragraph, and 101, because they are couched in an improper “use claim” format. This format has been removed from the amended claim set.

***Rejections under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph***

Claims 1-62 are rejected since the following terms allegedly do not place definite limits or boundaries on the claimed subject matter. Applicants traverse the rejections. As an initial matter, the Examiner has not shouldered his burden of providing a line of reasoning why the artisan of ordinary skill in the art would *not* understand the scope of the claimed invention, as set forth by the terms of the claims. The amendments thus do not necessarily indicate acquiescence to the propriety of the rejections, but are made to expedite prosecution, to clarify the meaning of the claims, or to conform the claim language to accepted form in the United States.

[1] “Derivatives” and “a derivative of”: “derivatives” is replaced by “compound” in the claims, as suggested by the Examiner. Applicant believes that these expressions are equivalent, and amend the claims according to the Examiner’s recommendation solely to expedite prosecution.

[2] “An organic compound comprising an aromatic ring” does not appear in the amended claims.

[3] “Comprising” is a well-known term in patent parlance. The Examiner is respectfully requested to clarify why “comprising” is listed among the terms that allegedly are unclear.

[4] “Noted” does not appear in the amended claims.

[5] “A substituent . . . comprising . . . proton donor or acceptor function capable of establishing,” “proton donor and acceptor function,” and “function” would be readily

understood by one of ordinary skill in the art, when taken in context in the claims and in the written description. *See In re Morris*, 127 F.3d 1048, 1054-55 (Fed. Cir. 1997). This phrase is used to describe the moieties (functions) F<sub>a</sub>, F<sub>b</sub>, and F<sub>c</sub>. As described throughout the specification, *e.g.* page 8, lines 20-29, such moieties establish hydrogen bonds with the target protein once they are bound. Moieties capable of establishing hydrogen bonds are well-known in the art. The specification (*id*) exemplifies primary and secondary alcohols as proton donor functions and carbonyl moieties as proton acceptor functions. Equivalent moieties are commonly known in the art.

[6] “Characterized in that,” which is common in international parlance, is replaced with “comprising,” in accord with standard practice in the United States.

[7] “Interacts with”: this phrase appears at claim 74 and is defined at page 8, lines 16-19. The artisan of ordinary skill understands that a molecule interacts with residues of a protein by forming any number of hydrogen bonds, van der Waals bonds, or ionic bonds or any combination thereof. No more description is necessary to set forth what “interact” means in this context.

[8] “Establishes” and “bonds established by”: “established” is used throughout the specification with reference to formation of bonds between different moieties. “Establish” thus is given its common meaning of “making secure or firm.” WEBSTER’S II NEW COLLEGE DICTIONARY, 1995.

[9] “Non-functionalized linear chain”: a linear, aliphatic chain is commonly understood in the art. A “non-functional” linear aliphatic chain lacks a functional group, which, as set forth at item [3] above, is a moiety that can form a hydrogen bond with the target protein when it is bound to the protein. The term “non-functional” thus would be understood to characterize the inability of the chain to form a hydrogen bond with the target protein. The linear aliphatic chain serves as a spacer between F<sub>a</sub> and the aromatic rings of the claimed compound, as described at page 7, lines 32-35, page 8, lines 30-34, and page 11, lines 31-33, among other places.

[10] “A possible” and “it being possible” do not appear in the present claims.

[11] “Comprises in addition” and “comprise a substituent” do not appear in the amended claims, although these terms would be readily understood and represent standard parlance.

See item [3]. "B and C each comprise at least one proton acceptor or donor function, F<sub>b</sub> and F<sub>c</sub>," appears at claims 123, 128, and 131. The artisan of ordinary skill would realize that "comprises at least" here means that the moieties B and C each contain one or more specified proton acceptor or donor function.

[12] "Bon" does not appear in the amended claims.

[13] "Capable of establishing" is readily understood by the artisan. As set forth at item [8], "establishing" itself would be understood readily. Giving "capable" its ordinary meaning, the artisan would understand that a compound that is "capable" of something has the "potential ability" or "capacity to be used . . . for a particular purpose." WEBSTER'S II NEW COLLEGE DICTIONARY, 1995 at "capability."

[14] "Di- or trisubstituted derivatives" has been replaced with "A di- or trisubstituted compound" in accord with the Examiner's suggestion.

[15] "And/or" does not appear in the amended claims.

[16] Claim 116, which corresponds to the subject matter embraced by claim 41, recites "or" instead of "and," as the Examiner recommends.

[17] "Uses as an intermediate" does not appear in the amended claims.

[18] A "hydrolyzable protective group" and "protected alcohol" would be readily understood by the artisan of ordinary skill. Protective groups are routinely bound to otherwise reactive groups to prevent unwanted chemical reactions involving the protected moieties. A hydrolyzable group is simply a protective group that can be lysed from the protected moiety by hydrolysis.

[19] "Uses . . . as starting material," while definite, has been replaced by "carried out on the [specified] starting material." Applicants presume that the Examiner objects to the term "uses," which has been removed.

[20] Neither "attachment" nor "possible attachment" appear in the amended claims.

[21] "Is obtained by" does not appear in the amended claims.

[22] "Magnesian synthesis" refers to reactions using a Grignard reagent. See, for example, page 14, lines 21-25, where an alkyl magnesium halide is used to obtain the compound of formula II. "Magnesian synthesis" thus means the same as a reaction using the Grignard reagent. Applicants are entitled to use to describe their invention however

they choose, provided their meaning is clear. *See, e.g., In re Castaing*, 166 U.S.P.Q. 550, 551 (CCPA 1970) (“An applicant is ordinarily entitled to be his own lexicographer, so long as his meaning is clear.”).

[23] “Monohalogenation,” or monohalogenating” in the present claims, refers to a reaction where a moiety containing a single halogen is covalently coupled to the compound at issue, as would be understood by one of ordinary skill in the art.

[24] “Such that” is not present in the amended claims.

[25] “Obtained directly from” is objected to as not explaining *how* the recited compounds are obtained. This phrase occurs in new claim 127, which corresponds to the subject matter of claim 57. The specification at page 15 describes the grafting of  $F_b$  and  $F_c$  by a Wittig reaction to an ylide that is obtained directly from  $P_aA'-H_2C-Ar-(CH_2Z)_2$  (II) (lines 19-30). An example of such a synthesis is provided in the subsequent text. Alternatively, the ylide may be derived via  $P_aA'-H_2C-Ar-(CH_2SO_2Ph)_2$  through a Julia reaction (lines 30-31). The Julia reaction was known to the artisan of ordinary skill at the time of the invention.<sup>1</sup> The text thus adequately describes how the compounds were obtained.

[26] “Is exposed to ylide precursors”: the term “exposed” is not present in the amended claims.

[27] “Precursor” would be understood by the artisan to mean a compound that “precedes another.” WEBSTER’S II NEW COLLEGE DICTIONARY, 1995. A ylide precursor, for example, is a ylide undergoes a chemical reaction to form a final product. A ylide itself is an intermediate in the Wittig reaction. DICTIONARY OF CHEMISTRY, D.W.A. Sharp, ed., 1990.

[28] “ $Ar(Me)_3 \rightarrow \dots$ ” is not present in the amended claims.

[29] “Secondary amine type” is not present in the amended claims.

[30] “Follows the conditions of Mitsunobu” is not present in the amended claims.

[31] “Compounds” is now “a compound,” where appropriate, as suggested by the Examiner.

[32] "Their application as therapeutically active substances" is not present in the amended claims.

[33] "Antiviral agents" would be understood by the artisan as encompassing a compound possessing antiviral activity, many of which are commonly known in the art. This same argument applies to "anti-retroviral agents."

[34] "Prevention of . . . HIV": the point raised by the Examiner appears to pertain to Section 112, first paragraph, instead of Section 112, second paragraph. The Patent Office informally interprets "prevention" *per se* to mean that the particular disease at issue is prevented from *ever occurring* by virtue of the recited treatment. Without acquiescing to the propriety of this interpretation, "prevention" in this context is not present in the amended claims.

[35] "As combination product . . . spaced out over time . . . therapy" is not present in the amended claims.

#### CONCLUSION

In view of the foregoing, it is respectfully urged that the present claims are in condition for allowance. An early notice to this effect is earnestly solicited. Should there be any questions regarding this application, the Examiner is invited to contact the undersigned at the telephone number shown below.

Respectfully submitted,

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<sup>1</sup> See, e.g., Lee *et al.* (1996) "Synthesis of 2,7-Diazabicyclo[3,3,0] Octane and 2,7-Diazabicyclo[3,3,0]Oct-4-Ene Derivatives Via Cyclization Reaction and Julia Reaction" *Synthetic Communications* 26: 1499-1505.

*Marked up version of the amendments*

**IN THE SPECIFICATION**

Last paragraph on page 8:

The aromatic ring is advantageously such that the nonfunctionalized linear aliphatic chain noted -CH<sub>2</sub>A' ~~comprises~~ comprises 1 to 8 atoms, among which are carbon atoms and optionally one or two heteroatoms. Heteroatom is understood to mean an atom other than carbon, for example N, P, O, S, Si or Se.

Second paragraph on page 15:

If it is desired to prepare a compound Ar(ABC) such that the groups B and C each comprise at least one proton acceptor or donor function, (F<sub>b</sub> and F<sub>c</sub>), ~~[...?.. There is another voice on the whole of this tape which is getting louder all the time!]~~ the manner in which B and C may be grafted will be distinguished depending on whether the bonds established by F<sub>b</sub> and F<sub>c</sub> with A-AR-(CH<sub>2</sub>-)<sub>2</sub> are carbon-carbon, carbon-nitrogen or carbon-oxygen bonds.

Seventh paragraph on page 19:

Figure 3B shows the results of an experiment similar to that presented in Figure 3A where the reporter gene is replaced by *luc*, ~~encoding luciferase~~ encoding luciferase.